Complete Summary

GUIDELINE TITLE

Inpatient management guidelines for people with diabetes.

BIBLIOGRAPHIC SOURCE(S)

American Healthways. Inpatient management guidelines for people with diabetes. Nashville (TN): American Healthways, Inc; 2002 Mar. 18 p. [48 references]

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

- Type 1 diabetes mellitus
- Type 2 diabetes mellitus
- Gestational diabetes mellitus

GUIDELINE CATEGORY

Management

CLINICAL SPECIALTY

Endocrinology
Family Practice
Internal Medicine
Nursing
Nutrition
Obstetrics and Gynecology
Pediatrics

INTENDED USERS

Advanced Practice Nurses
Allied Health Personnel
Dietitians
Nurses
Physician Assistants
Physicians

GUIDELINE OBJECTIVE(S)

To provide hospitals and their medical staffs with a set of guidelines for assuring that patients with diabetes have inpatient outcomes similar, both clinically and fiscally, to those of patients without diabetes; Specific goals include:

- Identification of all patients with diabetes
- Identifying and addressing the special needs of patients with diabetes
- Improving outcomes by optimizing glycemic control
- Raising the level of awareness of the health care team with respect to the unique challenges of diabetes and current standards of care
- Striving for lengths of stay equal to those of patients without diabetes

TARGET POPULATION

Adults and children with diabetes mellitus admitted to hospitals

INTERVENTIONS AND PRACTICES CONSIDERED

Inpatient management of diabetes, including the following aspects:

1. Identification, initial assessment and management plan
2. Optimal glycemic control
3. Medical nutrition therapy
4. Education and discharge planning
5. Optimal glycemic control for pregnancy

MAJOR OUTCOMES CONSIDERED

- Glycemic control
- Short-term and long-term diabetic complications
- Length of hospital stay

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Evidence in support of the guideline was developed through electronic searches of relevant literature.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Not stated

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

METHODS USED TO ANALYZE THE EVIDENCE

Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not applicable

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Consensus Development Conference)

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

To promote improved inpatient diabetes care, American Healthways assembled a panel of primary care physicians, specialty physicians and other health care professionals representing private practice, health plan and institutional perspectives. This panel was charged with the development of these Inpatient Management Guidelines. Their initial recommendations were then submitted for review by American Healthways' Scientific Advisory Council and to a panel of selected faculty specialists at the Vanderbilt University Medical Center. Finally, the guidelines were modified and endorsed by a Consensus Conference of over 100 physicians and other health care professionals with similarly varied perspectives convened by American Healthways at Key Largo, Florida, in November 1998. Subsequently, in February 2002, the American Healthways' Scientific Advisory Committee and Medical Advisory Committee reviewed the document for needed revisions and updates. By endorsement of the committees, the revisions are reflected in this version of the guidelines.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The guideline panel's initial recommendations were submitted for review by the American Healthways, Inc. (formerly the Diabetes Treatment Centers of America [DTCA]) Scientific Advisory Council and to a panel of selected faculty specialists at the Vanderbilt University Medical Center. The guidelines were modified and endorsed by a Consensus Conference of over 100 physicians and other health care professionals with similarly varied perspectives convened by American Healthways, Inc. at Key Largo, Florida, in November, 1998. Subsequently, in February 2002, the American Healthway's Scientific Advisory Committee and Medical Advisory Committee reviewed the document for needed revisions and updates.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

This guideline has been updated. The National Guideline Clearinghouse (NGC) is working to update this summary. The recommendations that follow are based on the previous version of the guideline.

Identification, Initial Assessment and Management Plan

Goal Statement: To identify all patients with diabetes, document attendant co-morbidities/complications, and determine appropriate therapeutic goals.

	Intervention	Health Care Professional[1]	Event/Frequency
Identification	1. Screening Protocol Diabetes complications can be best avoided through early detection and aggressive glycemic management. In addition, diabetes,	Admitting or emergency room nurse	On admission, pre-admission, or presentation to the emergency department

	whether diagnosed or not, is a significant determinant of a successful in-patient experience. Accordingly, hospital Medical Staffs are encouraged to adopt an appropriate protocol consistent with ADA screening guidelines for all patients >18 years of age.		
The remainder of these guidelines are applicable only to those patients with a confirmed diagnosis of diabetes mellitus.			
Initial Assessment and Exam	1. History of diabetes management and assessment of Standards of Care status (see "Exhibit A - Baseline Diabetes Assessment" in the original guideline document).	Physician/RN/LPN/CDE/RD	On admission/ pre-admission
	2. Documentation of symptoms of diabetes-related co-morbidities or complications (see "Special Considerations	Physician/RN/LPN/CDE/RD	On admission/ pre-admission

	" below).		
	3. Physical exam with special emphasis on diabetes-associated and other pertinent findings.	Physician	On admission/ pre-admission
Laboratory Tests	1. Serum creatinine	Physician	On admission/ pre-admission
	2. EKG	Physician	On admission/ pre-admission
	3. Urinalysis	Physician	On admission/ pre-admission
	4. Plasma glucose (PG)*	Physician	On admission/ pre-admission or presentation to the emergency department
	5. A1c	Physician	On admission/ pre-admission unless documented within previous one month
	6. Lipid profile	Physician	On admission/ pre-admission unless documented within previous one month

[1]In consultation with patient/caregiver
*Blood glucose meters for finger-stick testing use capillary (whole blood) samples, but with few exceptions, are calibrated to display the results in plasma values.
Abbreviations: ADA, American Diabetes Association; RN, registered nurse; LPN, licensed practical nurse; CDE, certified diabetes educator; RD, registered dietitian; EKG, electrocardiogram; A1c, glycated hemoglobin (previously abbreviated HbA_{1c})

Special Considerations

1. Insulin pump. Abrupt or unplanned alteration of pump regimen can result in rapid deterioration of glycemic control, resulting in acute complications (diabetic ketoacidosis or hypoglycemia) and adverse outcomes. Accordingly, any change in regimen should only be ordered by, or in consultation with, the primary diabetes care physician.
2. Pregnancy. Lack of optimal glycemic control in pregnancy has been shown to cause significant and life-threatening complications to mother and child. Accordingly, consultation* should be obtained with any admission of a pregnant patient with diabetes.
3. Coronary and Cerebral Vascular Disease. Early and optimal glycemic control may improve outcomes in patients with acute myocardial infarction, stroke/transient ischemic attack, percutaneous angioplasty, coronary stent placement and coronary artery bypass. Accordingly, any patient admitted with diabetes and one of these diagnoses may benefit from optimal glycemic management and may benefit from consultation.* See the "Optimal Glycemic Control" section, below, for further information concerning diabetes control.
4. Infectious Disease. Poorly controlled diabetes has been shown to cause significant impairment of host defense mechanisms in all infections. Accordingly, optimal glycemic control is paramount in the successful management of the infected patient, and consultation* may be indicated.
5. Inpatient Surgery. Optimal glycemic control will reduce the incidence of post-operative complications and, therefore, patients with diabetes having inpatient surgery may benefit from consultation.* See the "Optimal Glycemic Control" section, below, for further information concerning diabetes control.
6. Pediatrics. The tendency toward labile glucose values and special considerations related to managing diabetes in pediatric patients may result in compromised outcomes and therefore, these patients may benefit from consultation.*
7. Diabetic Ketoacidosis. Since diabetic ketoacidosis is a serious condition which requires intensive management, consultation with patient's primary diabetes physician should be considered.

*In these situations, consultation should be with a physician, who through experience and training, has demonstrated competence in the care of people with diabetes in the acute care setting. This may be the patient's primary care physician.

Optimal Glycemic Control

Goal Statement: To achieve the best glycemic control possible given the clinical situation, but in no event should plasma glucose values be allowed to exceed 150 mg/dL without assessment or intervention. While not always achievable, the ideal values described in the American Diabetes Association (ADA) "Clinical Practice Recommendations" for plasma glucose in the NON-PREGNANT individual are:

	Normal	Goal	Action
Preprandial (mg/dL)	<110	90-130	<90 or >150
Bedtime (mg/dL)	<120	110-150	<110 or >180

These values are generalized to the entire population with diabetes. Some patient populations warrant different treatment goals.

Monitoring	Intervention	Health Care Professional [1]	Event/Frequency
	1. A1c	Physician	On admission, unless documented within previous one month.
	2. Bedside plasma glucose monitoring[#], recorded on an appropriate flow sheet[##]	Physician	All patients at least 4 times per day unless being orally fed, in which case AC and HS.
	3. Blood glucose review	Physician	Daily[###]
	4. Alert values reported to physician	Nurse/Lab	PG <60 mg/dL, or per hypoglycemia protocol, >300 mg/dL, or by physician orders.
Maintenance	1. Reassess/adjust regimen*	Physician	PG <90 mg/dL, >150 mg/dL. This is in accordance with the ADA position statement "Standards of Medical Care for Patients with Diabetes." In order to achieve these parameters (>90 and <150), intravenous insulin infusion is often required in intensive care situations.

	2. Consultation** with an endocrinologist or a physician with recognized expertise in diabetes inpatient care.	Attending Physician	Should be considered when: 1. PG >300 mg/dL or <70 mg/dL on two occasions within 24 hours (in the absence of diagnostic criteria for items below) despite intervention 2. Major surgery 3. Diabetic ketoacidosis 4. Hyperglycemic, hyperosmolar non-ketotic state 5. Severe or recurrent hypoglycemia or neuroglycopenic symptoms 6. Acute macrovascular events 7. Serious infections or non-healing wounds Should be obtained: 1. Pump therapy 2. Pregnancy
Protocols and Standing Order Sets	1. Hospital Hypoglycemia Protocol***	Physician/Nurse	PG <60 mg/dL
	2. Hospital IV	Physician/Nurse	Diabetic

	Insulin Infusion Protocol		ketoacidosis and when ordered for other critically ill patients
	3. Hospital Perioperative Protocol***	Physician/Nurse	Pre-admission or as soon as possible prior to surgery
	4. Hospital Insulin Pump Protocol***	Physician/Nurse	Initiation and management

[1]In consultation with patient/caregiver
[#]Blood glucose meters for finger-stick testing use capillary (whole blood) samples, but with few exceptions are calibrated to display the results in plasma values.
[##]In order to assure effective communication of plasma glucose values among all members of the care team, a flow sheet should be developed and incorporated in the medical record for all patients.
[###]Adjustment of therapy is indicated if PG >150 mg/dL or <90 mg/dL. Intensive monitoring (>4 x daily) may be required under special circumstances such as post myocardial infarction (MI), total parenteral nutrition (TPN), steroid therapy, etc.
*Regimen includes nutrition, activity, medication and other therapeutic modalities. If sliding scales are utilized, it is recommended that a hospital protocol be developed.
**In these situations, consultation should be with a physician who, through experience and training, has demonstrated competence in the care of people with diabetes in the acute care setting. This may be the primary care physician.
***Hospital medical staffs are encouraged to develop and implement appropriate protocols for people with diabetes.
Abbreviations: A1c, glycated hemoglobin (previously abbreviated HbA_{1c}); AC, before meals; HS, at bedtime; PG, plasma glucose; IV, intravenous

Medical Nutrition Therapy

Goal Statement: To optimize metabolic status, the nutritional needs of every person with diabetes admitted to the hospital will be assessed. A nutritional plan will be developed by a registered dietitian for approval by the physician.

Establishment, Monitoring and Maintenance	Intervention	Health Care Professional[1]	Event/Frequency
	1. Initial specific nutritional plan for the	Physician and RD	On admission

	patient with diabetes		
	2. Comprehensive nutritional assessment	RD and Physician	Prior to or within 24 hours of admission
	3. Reassessment/regimen adjustment	RD and Physician	Daily or as indicated
	4. Discharge nutritional plan	RD and Physician	Prior to discharge
	5. Discharge instructions and follow-up plan	RD, CDE, RN, Case Manager, or Physician	At discharge

[1]In consultation with patient/caregiver
Abbreviations: RD, registered dietitian; CDE, certified diabetes educator; RN, registered nurse

Education and Discharge Planning

Goal Statement: To identify and correct both knowledge and self-care skills deficiencies and to establish an optimal transition into the post-hospital management of the patient.

	Intervention	Health Care Professional[1]	Event/Frequency
Assessment	1. Baseline diabetes assessment*	Physician, RN, CDE, or RD; with patient/caregiver	On admission
Patient Management Plan	1. Development of patient education plan to include, at a minimum, diabetes survival skills** and	Physician, RN, CDE, and patient and/or caregiver	Throughout hospital stay

	initiation/arrangement of outpatient plan to address identified deficiencies***		
Patient/Caregiver Skills Demonstration	1. Successful demonstration of patient glucose monitoring	RN, CDE, LPN	Minimum of two times prior to discharge
	2. Successful demonstration of administration of insulin, if indicated	RN, CDE, LPN	Minimum of two times prior to discharge
	3. Successful demonstration of foot inspection	RN, CDE, LPN	One time prior to discharge
Diabetes Follow-up	1. Patient standards of care**** status and outpatient education plan given to patient and reported to primary diabetes provider	Physician, RN, CDE, or RD; with patient/caregiver	Prior to discharge
	2. Follow-up diabetes management appointment recommended or arranged	Physician, RN, CDE or RD; with patient/caregiver	Prior to discharge

[1]In consultation with patient/caregiver
*See Exhibit A - "Baseline Diabetes Assessment" in the original guideline document
**See Exhibit B - "Diabetes Survival Skills" in the original guideline document
***See Exhibit C - "National Standards for Diabetes Self-Management Education Programs, Curriculum Content Areas" in the original guideline document
**** See Exhibit D - "Standards of Care" in the original guideline document
Abbreviations: RN, registered nurse; CDE, certified diabetes educator; RD, registered dietitian; LPN, licensed practical nurse

Optimal Metabolic Control For Pregnancy

(Gestational Diabetes Mellitus*,Type 1 Diabetes and Pregnancy**, Type 2 Diabetes and Pregnancy**)

Goal Statement: To achieve and maintain euglycemia before and throughout pregnancy. Euglycemia is defined as: fasting plasma glucose 65-90 mg/dL; One hour postprandial plasma glucose <140 mg/dL; A1c <6.5% during all trimesters

	Intervention	Health Care Professional [1,2]	Event/Frequency
Monitoring	1. A1c with normal range in pregnancy established	Physician	On admission
	2. Finger stick plasma glucose		Before and one hour after each meal, at bedtime, and at 3:00 am
	3. Plasma glucose review		Daily[#]
	4. Alert values reported to physician		PG <55 mg/dL, or >150 mg/dL
Maintenance	1. Reassess/adjust regimen	Physician	Pre-prandial <60 mg/dL or >90 mg/dL. One hour after meals <100 mg/dL or >120 mg/dL
	1. GDM, Diet	Physician/Nurse	On admission

Standing Order Sets	Controlled		
	2. GDM, Insulin Requiring***	Physician/Nurse	On admission
	3. Type 1 Diabetes and Pregnancy***	Physician/Nurse	On admission
	4. Type 2 Diabetes and Pregnancy***	Physician/Nurse	On admission
	5. Labor and Delivery for Types 1 and 2***	Physician/Nurse	On admission
	6. Labor and Delivery for GDM***	Physician/Nurse	On admission
	7. Post-Partum Care and Insulin Dosing*** a. For nursing mothers b. For non-nursing mothers	Physician/Nurse	Immediately after delivery
	8. Neonatal Care for Infants of Diabetic Mothers	Physician/Nurse	Immediately after delivery
	9. Hyperemesis Gravidarum and	Physician/Nurse	On admission

	Diabetes		

[1]In consultation with patient/caregiver
[2]Consultation with an endocrinologist/diabetologist and/or a high-risk obstetrician is strongly recommended for admission of a pregnant diabetic.
#To assure effective communication of plasma glucose values among all members of the care team, a flow sheet should be developed and incorporated in the medical record for all patients.
*Gestational diabetes is diagnosed when two or more of the venous plasma values following a 100 gram glucose load (after an overnight fast of between 8-14 hours and at least three days of unrestricted diet of over 150 grams of carbohydrates) are exceeded: Fasting 95 mg/dL; One hour 180 mg/dL; Two hours 155 mg/dL; Three hours 140 mg/dL
**Ideally, plasma glucose control should be established before pregnancy and is defined as A1c <4 standard deviations (SDs) above the mean of a normal population (using Diabetes Control and Complications Trial [DCCT] normal range of <6.01%:4SD=A1c <7.0%)
***Protocol should include specific instructions for management of hypoglycemia.

Abbreviations: A1c, glycated hemoglobin (previously abbreviated HbA_{1c}); PG, plasma glucose; GDM, gestational diabetes mellitus

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The recommendations offered in the original guideline document are based on peer-reviewed scientific publications and the collective expertise of the physicians participating in the consensus conference.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Appropriate inpatient management of diabetes mellitus
- Optimizing glycemic control
- Reduction in length of hospital stay

POTENTIAL HARMS

Not stated

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

Variation from this guideline is always acceptable if, in the opinion of the attending physician, individual circumstances require it. While standards are intended to be rigid and mandatory - making exceptions rare and difficult to justify - guidelines are more flexible, although they should be followed in most cases. Guidelines can be tailored to fit individual needs that are influenced by the patient, setting, resources and other factors. Deviations can be justified by individual circumstances. Options are intended to be neutral. They merely note the interventions available to practitioners.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Living with Illness

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

American Healthways. Inpatient management guidelines for people with diabetes. Nashville (TN): American Healthways, Inc; 2002 Mar. 18 p. [48 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1999 (revised 2002 Mar)

GUIDELINE DEVELOPER(S)

American Healthways, Inc - Public For Profit Organization

GUIDELINE DEVELOPER COMMENT

To promote improved inpatient diabetes care, American Healthways, Inc. (formerly the Diabetes Treatment Centers of America [DTCA]) assembled a panel of primary care physicians, specialty physicians and other health care professionals representing private practice, health plan and institutional perspectives. These guidelines were modified and endorsed by a Consensus Conference of over 100 physicians and other health care professionals with similarly varied perspectives, convened by American Healthways, Inc. at Key Largo, Florida, in November, 1998. Subsequently, in February 2002, the American Healthways´ Scientific Advisory Committee and Medical Advisory Committee reviewed the document for needed revisions and updates. By endorsement of the committees, the revisions are reflected in this version of the guidelines.

SOURCE(S) OF FUNDING

American Healthways, Inc. (formerly Diabetes Treatment Centers of America [DTCA])

GUIDELINE COMMITTEE

The original draft of the guideline was developed by a Medical Steering Committee consisting of physicians representing clinical practice, health plan medical directors, and hospital-based program medical directors.

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Members of the Original Steering Committee: Kent Corral, MD; Frank DiTirro, MD; Daniel Duick, MD; Leonard Mastbaum, MD; Brendan O'Malley, MD; Julio Pita, MD; James Pope, MD; William Rush, MD

The draft was then submitted to the 100-plus physicians attending the consensus conference for review, modification, and adoption. The final version represents the work of the consensus conferees, all of whom are identified within the original guideline document.

Members of the 2002 Review/Revision: Charles H. Booras, MD; John Dixon, MD; Marjorie King, MD; Howard Lilienfeld, MD, FACP, FACE; Leonard Mastbaum, MD; Allen J. Naftilan, MD; James E. Pope, MD; F. David Rollo, MD, PhD, FACC, FACNP; William E. Rush, MD; Robert E. Sevier, MD; Roger Shell, MD; Fred G. Toffel, MD

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This guideline has been updated. The National Guideline Clearinghouse (NGC) is working to update this summary.

GUIDELINE AVAILABILITY

Electronic copies of the updated guideline: Not available at this time.

Print copies: Available from American Healthways, Inc., 3841 Green Hills Village Drive, #300, Nashville, TN 37215.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on June 29, 1999. The information was verified by the guideline developer as of July 30, 1999. This summary was updated by ECRI on July 17, 2002. The information was verified by the developer on August 13, 2002.

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